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NUCLEAR DETERRENCE ISSUES AND OPTIONS STUDY

A BASELINE ASSESSMENT OF DoD STAFF NUCLEAR EXPERTISE

FINAL REPORT

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BACKGROUND: The Defense Threat Reduction Agency (DTRA) was founded in 1998 to integrate and focus the capabilities of the Department of Defense (DoD) that address the weapons of mass destruction (WMD) threat. To assist the Agency in its primary mission, the Advanced Systems and Concepts Office (ASCO) develops and maintains an evolving analytical vision of necessary and sufficient capabilities to protect United States (U.S.) and Allied forces and citizens from WMD attack. ASCO is also charged by DoD and by the U.S. Government generally to identify gaps in these capabilities and initiate programs to fill them. It also provides support to the Threat Reduction Advisory Committee (TRAC), and its Panels, with timely, high quality research.

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1.0 Summary

This analysis assesses the state of staff nuclear expertise within the DoD to determine if it is sufficient for the department to carry out its nuclear responsibilities. It proceeded on the premise that nuclear expertise had atrophied since the end of the Cold War and this decline was now negatively impacting the nuclear mission.

The first step in the analysis was to assess each service's understanding of its nuclear "staff requirements". In short, does the particular service understand how many nuclear staff billets it must fill within DoD and elsewhere (DOE, State Department, etc), and the specific job qualifications of each billet? Next, the team reviewed each service's process to identify, develop, and assign staff officers with the requisite skills to meet user requirements. Finally, the team conducted interviews with a wide cross section of "users" of staff nuclear expertise, including OSD, Air Staff, Navy Staff, DTRA, Joint Staff, USSTRATCOM, HQ20AF, SUBLANT, HQ8AF, AFSPC, and ACC. These discussions were central to our assessment of the state of DoD staff nuclear expertise to determine the level of "user satisfaction" with current staff nuclear expertise. In addition, the interviews solicited "users views" on trends in staff nuclear expertise for the future as well as suggestions for improving the quality of staff personnel.

We conclude that the current level of staff nuclear expertise, with some key exceptions, allows DoD to carry out its nuclear responsibilities to a satisfactory level today. While the opinion of the majority of users agreed with a portion of our initial premise (i.e., staff nuclear expertise is in a state of decline), the consensus is that today's pool of available nuclear expertise satisfactorily supports mission accomplishment. However, staff leaders told us they must compensate for the ongoing decline in expertise through longer on-the-job training, more mentoring of young officers and civilians, hiring more civilians to fill previous military positions, and the growing use of contractors to provide needed continuity of expertise.

There are, however, key exceptions to this satisfactory assessment. These exceptions occur in some of the more specialized nuclear expertise areas such as munitions/stockpile management, modeling and simulation of nuclear weapons effects, safety and surety, and post-attack residual capability assessment (RECA). While the billets are few in number, the shortfalls in these important fields are indications that current and future staff expertise is at very low levels today and that even civilian and contractor expertise may be in short supply.

Another important exception to the “satisfactory” assessment involves the future. **Although most staff leaders gave a “satisfactory” rating to today’s pool of nuclear expertise, many users expressed significant concerns that an impending “cliff” lies ahead for staff nuclear expertise.** This “cliff” is a time in the next 5-7 years wherein the nuclear community will no longer be able to “live off the fat of the land” of Cold War-experienced personnel and wherein significant shortages in and dilution of nuclear expertise will be the norm.

Key Findings *(Expanded details can be found in Section 4.3.1, pp. 23-29)*

General

1. Senior DoD staff leaders are generally satisfied with the current quality of staff officers and civilians assigned from all three services. With exceptions in some specialized areas, officers and civilians have sufficient nuclear expertise to satisfactorily accomplish today’s mission.
2. These same senior leaders, however, view the quality and quantity of staff nuclear expertise as being in a state of decline since the end of the Cold War. Several described the dwindling pool of expertise as “living off the fat of the land,” with an impending “cliff” (onset of significant expertise shortfalls) coming within the next 5-7 years. On most staffs, service civilians and contractors are providing needed continuity and compensating for some expertise shortfalls.
3. Nearly all staff leaders expressed concern about the impacts on nuclear expertise of a perceived lack of senior DoD leadership attention to “things nuclear.” These concerns fuel widespread perceptions, particularly among young Air Force officers, that nuclear careers are “dead-end.” Many leaders expressed fears that today’s top-notch young officers are avoiding nuclear careers, thus producing a cadre of future leaders less capable of advocating nuclear programs, providing crucial nuclear advice, and running large, nuclear surety-intensive operations.
4. There are current expertise shortfalls in some specialized nuclear areas: munitions and stockpile management, nuclear weapons effects modeling and simulation, safety and surety, and post-attack residual capability assessment (RECA). Staff leaders are concerned about the lack of specialized expertise in the “pipeline” to replace retiring experts or a program to develop them. Continuity of expertise may become a near-term problem in these areas.

5. There is a strong belief that staff nuclear expertise has become “diluted” (i.e., officers possess less depth of expertise/have fewer total years in nuclear assignments) compared to a few years ago. This is particularly apparent in the Air Force where career opportunities for junior officers in nuclear assignments have changed significantly. Career paths and choices today for these officers are more diverse than during the Cold War.
6. Post-Nuclear Posture Review (NPR) nuclear planning will present a new set of challenges which will require future war planners to have not only significant systems expertise, but a fundamental grasp of national level, theater, and rapid/adaptive planning processes as well. There is concern, expressed by a number of staff leaders, that these challenges will severely test the talents and expertise of our nuclear staff officer corps.

Army

7. The Army, with US Army Nuclear and Chemical Agency (USANCA) in charge, has a relatively small (270), but well-developed and managed cadre of staff officers that provide senior leadership advice on employment of nuclear weapons and the survival of equipment and personnel to weapons effects on the battlefield.
8. USANCA has a clear picture of the nuclear staff billets they must fill, the background and expertise required to be successful in those billets, and a well-defined career path for their nuclear staff officers (Functional Area 52's). Since the Army has not been in the “delivery” business for some time, officers typically enter the career field at the 10-12 year point.
9. The Army's relatively small nuclear community allows for a very personal approach to the assignment process. Organizations are quite pleased with the quality of Army nuclear staff officers and all indicators point to continued maintenance of nuclear expertise.

Navy

10. The Navy nuclear community has become smaller, but remains focused and mission-centered. The Strategic Systems Program Office (SSPO) continues to provide key technical and strategic systems management expertise to the nuclear Navy. They have formed a cohesive uniformed-civilian-industry team to oversee technical weapons and SSBN systems in a “cradle to grave” manner. The civilian force is “graying” and, the Navy is stepping up to the challenge of attracting smart, young civilians into the nuclear business.

11. Most Navy staff nuclear expertise comes from the “1120” career field officers who support users between at-sea assignments. Leaders are satisfied with the quality of SSBN-SSN staff officers assigned, but clearly less satisfied with the quality of non-nuclear staff officers.
12. The majority of users would like the current short staff tour for nuclear power qualified officers (22 months) to be longer.

Air Force

13. Like the Navy, the Air Force nuclear cadre has become smaller but remains highly professional and mission-oriented. Despite a small staff, the HQ USAF Directorate of Nuclear and Counterproliferation (AF/XON) has become a particularly effective nuclear focal point and advocate for Air Force nuclear issues and people.
14. The Air Force has a well-established process to match people to billets. Even though the ICBM community is still sizable, assignment specialists pay personal attention to match individual qualifications to specific job requirements.
15. Users are generally satisfied with the quality of Air Force staff officers assigned to their organizations, although most agree the depth of expertise has declined over the past few years. At each agency visited, the majority of users expressed concerns over the future availability of nuclear expertise in the next 5-7 years. We observed a general theme that officers with specialized nuclear expertise are getting harder to find.
16. Most staff leaders observed that many Air Force officers continue to perceive the nuclear career field as a “dead end” or not viable. They also expressed concerns that perceived lack of support for “things nuclear” at the senior DoD leadership levels results in “the best officers pursuing other careers.” There have been mixed messages to the troops on what is a good career, and career path.

Recommendations (*Expanded details can be found in Section 4.3.2, pp. 29-32*)

1. The DoD should immediately address expertise shortfalls in the specialized staff fields of munitions/stockpile maintenance, nuclear effects modeling and simulation, safety and surety, and post-attack RECA.

2. The Air Force should consider the following recommendations to address two primary areas of concern identified in this assessment: “dilution” of nuclear expertise in the ICBM and bomber arenas and the negative perceptions associated with the viability of a career in the nuclear field.
 - Re-institute a selective, career path enhancement program for ICBM officers (analogous to the TOP HAND program under SAC).
 - As a companion to the above program, develop an Advanced Nuclear Course for both ICBM and bomber officers that parallels the existing Weapons Instructor Course (WIC).
 - Senior leaders should reaffirm and clarify the need for and value of core expertise in nuclear career fields.
 - Consider starting all space and missile officers with an ICBM crew tour.
 - Consider a concept similar to the Navy’s Limited Duty Officer (LDO) Program to provide a source of sustained nuclear expertise over the long-term.
3. The Air Force should continue to develop and expand the process to identify, track and develop needed staff nuclear expertise. As such, we believe the Developing Aerospace Leaders (DAL) concept of a “certification matrix” that combines education, training and experience to attain levels of expertise has merit. The career path enhancement program (TOP HAND) and Advanced Nuclear Course mentioned above track with this concept.
4. DoD and the Services should address the need for continuity of staff nuclear expertise through expanded use of civilian billets, contractor personnel and/or Guard and Reserve assets if available. In particular, the Services should focus on those areas most in need of staff continuity (e.g., safety/surety, munitions/stockpile management, nuclear effects modeling and simulation and RECA).
5. The Army should review the need for recruiting and developing civilian staff nuclear expertise.
6. The Navy should review its policy for assigning non-SSBN/SSN officers to staff nuclear billets to ensure user needs are fully met.
7. The Navy should determine the feasibility of extending nuclear power qualified officer staff tours beyond 22 months.

8. The DoD should review the staff nuclear expertise implications for planning in the post-NPR era.

2.0 Introduction

This report is an analysis by Science Applications International Corporation for the Defense Threat Reduction Agency. Its focus is on nuclear expertise at the staff level within the Defense Department. The report assesses the overall state of such expertise, examines the underlying processes for developing and distributing the expertise, and evaluates user satisfaction with the product of those processes.

For purposes of this study, nuclear expertise is defined as the combination of knowledge and experience gained by military and civilian personnel during one or more tours of duty at the unit or headquarters level. While nuclear weapons remain a central feature of US national security policy, the state of US nuclear expertise has undergone significant change. This expertise is available in fewer places and in diminished concentration, but also covers fewer weapon systems in a greatly reduced numbers of deployed locations. This study acknowledges these marked changes and examines the implications for DoD staff agencies still charged with executing nuclear responsibilities.

Events of the last twelve years have changed the role of US nuclear weapons and impacted the levels of personnel expertise associated with them. Nuclear weapons were the dominant feature of US national security policy during the Cold War, and a robust architecture of operational units, command headquarters and service staffs housed an extensive body of knowledge regarding nuclear operations. The end of the Cold War, however, brought fundamental change, reshaping not only that body of knowledge itself but also the system for sustaining, refreshing and applying it. Many individual changes occurred in isolation, although the practical impact of their synergy has become increasingly clear.

Consider the impact of the most noteworthy events since 1989; the collapse of the Soviet Union and the rise of low-intensity conflict brought a decline in US emphasis on nuclear weapons. At the policy level, the National Command Authorities ended bomber alerts, inactivated Minuteman II ICBMs and decommissioned all Army weapons (terminating the Army's nuclear delivery mission). Implementation of the INF Treaty eliminated an entire class of nuclear weapons from Europe. The 1994 Nuclear Posture Review led to downsizing of the nuclear-committed bomber force and removal of nuclear weapons from carrier battle groups. Meanwhile, as the nuclear force structure was shrinking, organizational realignments and consolidations led to smaller planning staffs at operational headquarters. Additionally, service-level decisions regarding personnel management, like the Air Force's merger of the ICBM and space career fields, forced changes to traditional career

progression models. In short, the system within the so-called “nuclear community” that had developed planners, groomed leaders and provided policy makers with nuclear advice had been radically reshaped. The new environment was a product more of evolution than design, the sum total of numerous substantive changes in the way the United States thinks about its nuclear forces.

This report reflects the nature of these changes, assesses their impact on nuclear-related decision-making specifically at the staff level and offers some options for dealing with the changes. The staff level distinction is important because it highlights the assumption that services have reasonable accession and training programs to sustain core competencies at the unit level. Whether that proficiency translates into usable expertise at higher echelons of command, however, is another question--and the heart of this analysis.

Of note, the authors acknowledge there are rich fields for additional, related study that this study does not address: the special roles played in the nuclear community by intelligence, maintenance, security and other related support areas were not examined in depth. The focus of this analysis is on nuclear staff expertise from an operations perspective. These support fields, while clearly deserving examination, are beyond the scope of this report. In addition, the relatively small scope of and funding for this study precluded the authors from visiting nuclear units and headquarters in Europe.

3.0 Methodology

This study is divided into four functional tasks. The first three tasks combined to form the data gathering phase. The last task constituted the analytical phase in which the authors integrated their findings, drew conclusions and developed recommendations.

Phase I - Data Gathering

Task One assessed government-wide requirements for DoD staff nuclear expertise. This task was necessary to determine whether there existed a common understanding of the requirements on both sides of the provider-user equation. The study team conducted personal interviews with key personnel managers in the Army, Navy and Air Force to gather data on providers' views.

Task Two examined Service processes for identifying, developing and assigning military and civilian personnel with staff nuclear expertise. Again personal interviews were conducted with key functional area personnel managers to review and document the processes each service uses to match available nuclear expertise to existing requirements, as well as the career progression ladder that guides and grooms individuals through early operational assignments to staff positions.

Task Three required yet another round of interviews, this time with a cross-section of staff leaders within user agencies to determine the extent to which their organizations' needs are met by the personnel the services assigned to them. This part of the study asked about both quantity and quality, i.e., whether there were enough personnel assigned to fill all authorized billets, and whether those personnel possessed the requisite expertise to meet the organization's needs.

Phase II - Analysis

Task Four integrated the results of the first three tasks. This product summarizes the examinations, interviews and analyses to provide an assessment of the overall health of DoD's staff-level nuclear expertise as well as the processes and institutions that sustain it. This task includes findings and recommendations for improvement.

4.0 Staff Nuclear Expertise Assessment

4.1 Government-Wide Requirements for DoD Nuclear Staff Expertise and Service Processes to Identify, Develop, and Assign Personnel (Tasks 1 & 2)

Assessment

The Army, Navy, and Air Force all have a clear understanding of their requirements to provide staff nuclear expertise to users both internal and external to their services. While there are variations, each understands the numbers of billets and qualifications for each billet. The Army has the best management of its process given the small size of the career field. A single individual manages the entire process of personal contact with users and matching officer desires and qualifications of the openings with qualified personnel. The smaller Navy nuclear community remains focused and mission-oriented. There continues to be a sufficient number of SSBN-SSN officers to fill the requirements. Not much has changed over the years. Given the large pool available (mostly from the ICBM crew force), the Air Force continues to supply the majority of the officers to fill user nuclear staff billets. They work closely with the users to understand mandatory and desired qualifications for projected vacancies. There is no central “database” of all staff billets and their requirements.

4.1.1 Army

Team members met with a representative of USANCA and received a detailed briefing on the duties and responsibilities of Army nuclear staff officers, where they are assigned, typical career progression, the assignment process, and current career field issues.

Army nuclear staff officers are assigned to Functional Area 52 (FA 52). They provide technical and policy recommendations to Army and DoD agencies including employment in support of theater commanders, survival of equipment and personnel, and treaty implementation considerations. USANCA is the Army “proponent manager” for the FA 52 career field. The Army has not had a nuclear delivery mission since the early 1990s. The nuclear mission is not highly visible in the Army and many outside the Army are surprised that there are still officers in the nuclear career field.

The officers typically enter the career field as new majors from another Army branch. Most officers have a technical bachelors degree, and either have an MS or will be plugged into an advanced degree program at the outset. Many attend the Air Force Institute of Technology (AFIT) at Wright Patterson AFB,

OH. USANCA believes the quality of officers entering the career field is “very good”. The opportunity for an advanced degree and work in a technical field is appealing. The career field has declined in numbers in recent years from almost 500 in FY 92 to about 270 today. This number is expected to remain steady for the time being.

USANCA monitors the location and requirements of the billets to be filled. The FA 52 manager has worked closely with the supervisors of “his billets” for many years and he tracks openings 12-18 months in advance. He knows most of the FA52s personally and is usually able to make a good marriage between supervisor needs and officer desires. Also, an officer in an advanced degree program will often coordinate his/her thesis work with the agency to which they will be assigned, therefore selecting a research area that directly supports the duties to be performed. USANCA coordinates closely with the Army personnel command to make the assignment machinery work.

Most FA 52 officers are assigned to joint agencies; DTRA has the largest number (about 50); while others are assigned at staff locations such as USSTRATCOM, DOE/NNSA, DIA, PACOM or EUCOM. Army agency assignments are at locations like the USMA and USANCA. Officers will typically get three assignments prior to O-6 -- two at DTRA, and one at a four-star command (e.g. EUCOM) or at an “other agency” (e.g. DIA, State Department).

There are only a few civilians in the nuclear career field and many are former active duty members. The civilian force is “graying” and there is no program to develop the civilian expertise for the future. There are no enlisted in the career field.

The bottom line is that the Army has a well-defined mission and career track for nuclear staff officers. They know how many staff officer requirements there are, where they are located, they track the job descriptions and requirements closely, and have an established plan to rotate new field grade officers through a variety of assignments to be competitive for Colonel.

4.1.2 Navy

The study team met with a cross section of officers and civilians from the Navy Strategic Systems Program Office (SSPO) to discuss staff nuclear expertise and understand the Navy nuclear career field. The team met with Navy staff (N-51), interviewed the Navy nuclear officer detailer at the Navy Personnel Command and the SUBLANT (N-9) via teleconference, and reviewed a recent analysis of Navy Nuclear competence. See Reference D.

The Navy has sustained a cohesive, dedicated, and mission-focused military, civilian, and industry team despite considerable downsizing since the end of the Cold War. Even if more Trident boats are taken out of the strategic mission, there will continue to be an adequate pool of experienced nuclear personnel to fill staff billets.

The Navy has both unrestricted line (URL) officers and limited duty officers (LDOs). LDOs are a carryover from diesel submarine days and fill mostly strategic weapons officer billets on today's SSBNs. They are specialists who provide technical expertise in strategic weapons systems to meet user and fleet needs.

URL officers in the SSN-SSBN career field are designated the "1120" specialty field. There is no specific preparation of officers assigned to joint billets such as USSTRATCOM other than their technical expertise from serving on an SSN-SSBN in one or more departments (e.g. engineering, propulsion, weapons, or navigation.) Officers gain needed staff expertise on the job. While joint duty is an opportunity to broaden nuclear experience, for the most part the Navy considers staff positions a "holding pattern" until the officer returns to sea.

There is a good ship mix due to personnel transfer between ships; however, in a few years not all personnel will have worked aboard an SSBN.

Non-SSN/SSBN officers are routinely assigned to nuclear staff billets. Unless they were assigned to a TACAMO squadron, they will bring no nuclear background to the staff position.

Navy detailers work closely with the users to ensure the quality of the officer assigned meets their needs. There is no formal staff grooming process per se but they try to match breadth and depth of experience to the job requirements. For example, the Navy will try to fill demanding staff billets, such as the missile team in the Air Room at USSTRATCOM, with an experienced submariner who has completed a department head tour on an SSBN.

Overall, there are some concerns with regard to personnel.

- *Industry:* Loss of expertise; "gray heads" are retiring and not present to mentor young people; gaps in development of new/follow-on systems will impact industries that support the SSPO.
- *Navy Civilian:* Significant downsizing occurred from late 1980s to today; adequate staff expertise exists today, but concerns remain about the future – lots of "old heads" eligible for retirement (60 % within 5 years) and too few young engineers being brought on board to sustain the expertise.

- *Knowledge Erosion:* Some erosion of “strategic knowledge” exists due to fewer platforms and changed at sea procedures, but this is not seen as a major problem.

On the plus side, adequate programs are in place to recruit and retain quality engineers. The SSPO does not rely on the Navy personnel system *per se* – they capitalize on “in house” personnel, education, acquisition program management and other technical education. Significant pay incentives and the mission are keeping good quantity/quality of enlisted and officers in the career field. Multiple career paths -- URL, LDOs, CWOs, and engineering duty officers – also help maintain expertise.

4.1.3 Air Force

Team members met with HQ USAF career field managers, a representative from the *CSAF Developing Aerospace Leaders (DAL) Program Office*, and interviewed the chief and members of the Air Force ICBM assignment team at the Air Force Personnel Center (AFPC) via teleconference. Also, the team conducted interviews with a former chief of the ICBM assignment team.

The Air Force fills more than 400 ICBM staff billets and can project the number of these that must be filled each year. But generally, the Air Force plays a “reactive” role in the assignment process. This means that a projected vacancy, position description, and qualifications from a user will trigger the assignment process. There is no central database that contains all the staff positions the Air Force fills. This is not unique to the nuclear career field, however.

Despite the large number of officer positions it must fill, the assignment team makes every effort to make the process “personal” and works closely with the user and the officers involved. For the ICBM portion of the Space Operations career field, there is an established career track (“pyramid”) that describes, in general terms, career options and progress from crew duty (lieutenant) through senior staff and command (colonel). There is no process to develop specific nuclear staff skills, but assignment managers have been successful in matching backgrounds to requirements but they admit the pool of highly qualified staff officers is definitely shrinking. Intermediate-level staff positions in the inspection and testing arena have largely been eliminated. Historically, these positions were the breeding ground for future ICBM staff leaders and commanders.

The Air Force has made considerable improvements in the assignment process in recent years by tagging key billets that require nuclear expertise and developing a methodology to identify personnel with nuclear experience (tracking personnel reliability program (PRP) identifiers in personnel records). While these changes were intended to remedy operational (field) problems, they also benefit staff positions. However, there is no system in place that automatically updates nuclear experience (PRP) – it must be done manually and it is not clear this is done on a regular basis.

Currently, there is no central listing of staff jobs, location, position descriptions, or qualifications for every ICBM staff position, both in the Air Force and other agencies. In the past, staff opportunities were listed in a “Missile and Space Career Opportunities Track” (MASCOT) that provided a guide to career development and planning and the necessary background and skills required for each position. The study team and many in the Air Force agree that a MASCOT-like product would be very valuable.

An initiative that is starting to pay dividends is the Air Force Nuclear Technology Fellowship Program (NTFP). The NTFP allows three promising officers each year the opportunity to deepen their nuclear expertise through a two-year assignment at Sandia National Laboratory. The officers mix academic training with hands-on laboratory experience and are then assigned to key nuclear staff billets. At ACC, a recent graduate is filling an important nuclear safety/surety position and “...has been a big help – he understands how nuclear weapons operate. Not many operators do.”

4.2 User Satisfaction (Task 3)

The study team met personally with a wide cross-section of DoD users to assess their satisfaction with the quality and quantity of staff nuclear expertise provided by the services to their organizations. We talked to more than 90 people across the entire grade spectrum, from senior NCO, junior officer (O-3), to senior civilian (SES – 4) and flag officers. We also interviewed internal service “users” of staff nuclear expertise, including HQAir Force Space Command, HQAir Combat Command, HQ8AF, HQ20AF and SUBLANT. The team asked these senior leaders a series of questions and most completed a short survey (Appendix B) that served as a “quantitative summary” of their views on the subject of nuclear staff expertise. In addition, senior military retirees with recent experience in the nuclear business were also tapped. Survey results are at Appendix C.

4.2.1 The Situation Today

The nuclear expertise of today is sufficient for major DoD agencies to accomplish their missions in a satisfactory manner. With some exceptions, users are generally satisfied with the quality of staff officers assigned to their organizations. The majority of those the team met with believed there is sufficient staff nuclear expertise in their organizations and they were satisfied with the technical and operational skills of the officers assigned.

- **Army:** Although Army nuclear officers are few in number, staff leaders were impressed with their quality. USANCA works closely with the gaining organization and the nuclear officers to make a good match of job requirements and officer skills and desires. Army nuclear officers are well educated --most all have technical undergraduate degrees and an advanced degree targeted toward their field of interest and future job. They are highly motivated – all are volunteers for the nuclear career field and understand the duties, assignment locations, and likely career path. While those entering the career field no not have hands-on operational nuclear experience (the Army has not had a nuclear delivery mission for over a decade) staff leaders do not see this as a problem today or in the future.
- **Navy:** The Navy nuclear community remains focused and mission-oriented, although it has been reduced in size along with force structure. Senior staff leaders are generally satisfied with the Navy 1120 officers assigned to their organizations (although one senior officer expressed concern that many Navy officers assigned to USSTRATCOM failed to screen for command). Despite this, most believe the quality of 1120 officers has not diminished and will continue to be of high quality. Maintaining continuity in the Navy staff positions is a continuing problem due to the time required to become effective on the job and the short staff tour, typically 22 months. This challenge is not a new one.

At USSTRATCOM, the Navy has an informal, but effective, mentoring program for submariners stationed in America's heartland. An experienced O-6 monitors personnel assignments, staff officer performance, and provides mentoring/counseling. Some believe the high quality of 1120 officers at USSTRATCOM is positively influenced by the personal involvement of the most recent CINCSTRAT, a nuclear submariner.

While there is high user satisfaction with the 1120 staff officers, the study team got the clear message that the non-SSN/SSBN officers assigned were of a lesser caliber and required significantly more "spin up" time before becoming effective.

- **Air Force:** The Air Force continues to provide a high percentage of staff officers to large users such as USSTRATCOM and DTRA. Most senior leaders continue to be well satisfied with the quality of officers provided by the USAF. In particular, agencies like USSTRATCOM/J-5 prefer officers who have a broad perspective of both operations and policy and strategy. They are particularly satisfied with ICBM officers who seem to get “up to speed” on the issues quickly and grasp the complex nature of the responsibilities. Unlike the SAC days, there are relatively few bomber officers at USSTRATCOM and they generally do one tour at the O-4 level, and seldom return. Also, few have had actual nuclear alert experience.

4.2.2 Current Concerns and Worrisome Trends

Some Shortfalls Today

Specialized Staff Disciplines: The study team found some current shortfalls in nuclear expertise, particularly in the more specialized staff disciplines. While relatively few in number, these specialized areas of expertise at USSTRATCOM and service headquarters are central to the nuclear business. For example, senior staff leaders at USSTRATCOM cited the shortfall in expertise and lack of continuity in the nuclear effects modeling and simulation area. A senior supervisor with more than 25 years of experience said that newly hired officers are less experienced than the past and are taking longer to understand the complexities of nuclear effects. Additional problems include the difficulty they have in finding any minimum-qualified officers to fill vacancies or lack of success in finding a contractor to fill the position. Continuity of expertise is a growing problem.

Another area of concern is nuclear munitions/stockpile management. Again at USSTRATCOM, senior staff leaders are holdovers from the days of SAC and they do not see younger officers coming into the field to be groomed to take their places. In addition, they perceive a shallower understanding of and lack of appreciation for nuclear stockpile issues in some parallel staff organizations in DoD. Unlike the past, they are spending considerable time “educating” counterparts and leadership on pressing issues.

At ACC, the expertise in the munitions area is bolstered by a strong senior enlisted cadre and the use of contractors. However, these same senior NCO’s were concerned that their successors in the field were not gaining a similar in-depth knowledge and level of “regard” --need for strict adherence to standards-- for the nuclear mission. Most understand the basics, but are limited if there is a problem. “They know what it says in the T.O. and not much more.” This is a concern in bomber units, but even more so in fighter wings with a nuclear mission.

With regard to concerns raised about munitions expertise, the Air Force, in 1999, re-instituted the "21M" Air Force Specialty Code (AFSC) for officers. In effect, they combined the former ICBM maintenance and Air Force-wide munitions career paths. Senior Air Force leaders believe this will go a long way toward resolving munitions expertise concerns -- but caution that it will take a number of years to "grow" staff expertise. In addition, the Air Force has resurrected the nuclear weapons safety officer AFSC. The "growing" of this expertise will parallel the munitions expertise process and will not only require a number of years to produce staff expertise but will require funded billets which do not yet exist.

At HQAFSPC there appears to be a shortfall in the area of nuclear safety and surety expertise. There is a relatively small, three person staff, and the overall knowledge of the nuclear safety area was self-described as "less than desired." The chief had no previous safety experience and the senior NCO had spent the previous seven years at a base with no nuclear mission. Of necessity, they have to rely heavily on the numbered Air Force for expertise. This area seems a natural for insertion of civilian or contractor expertise for continuity and, given the absolute requirements for safety and security in the nuclear business, an area requiring significant attention.

At USSTRATCOM, concerns were expressed in the area of post attack residual capability assessment (RECA). One RECA staff officer lamented, "no one seems to care," but added, "this may change in the aftermath of the 11 September tragedy!"

Inspection Teams: A concern voiced at USSTRATCOM and other locations was the impact of declining nuclear expertise on service inspection teams. One senior leader shared his involvement with a not-yet completed study of this issue. He indicated most service inspection teams have a "thin veneer" of nuclear expertise which they must augment with a small number of core experts from adjacent organizations. A growing problem is that while most inspectors can accomplish the key inspection tasks, there is a noticeable decline in the teams' abilities to look past the discrepancies themselves and understand the "root causes and/or systemic problems" behind the write up. Also, continuity of nuclear expertise, as it is in other areas, is becoming a problem for IGs.

Concerns Regarding Depth and Breadth of Staff Nuclear Expertise

While most senior leaders indicated overall satisfaction with the quality of nuclear expertise, they cited several disturbing trends that pose concerns for the future. This section summarizes, with a series of examples, concerns about the decline in breadth and depth of staff nuclear expertise. These concerns have been described by many staff leaders as "dilution," i.e., officers

today possess less depth of expertise/have fewer total years in nuclear assignments, compared to a few years ago.

At AFSPC HQ, most senior leaders indicated dissatisfaction with the depth and breadth of nuclear experience in their areas, and most said the level of experience in their organization is less than it was a few years ago. One senior staff leader said there was a noticeable decline in the quality of staff packages over the past year or so. He noted his average young officers have spent less time in the nuclear business than similar staff officers ten years ago. His analysis was, "They don't seem to fully understand the depth and breadth of questions that must be asked to completely staff an issue." "It's the inch deep and a mile wide syndrome at work here," he said and, "they don't know what they don't know."

One senior officer lamented that the staff expertise problem is moving on in time, getting worse each year and nothing concrete is planned to stop the movement prior to the impending cliff -- after which it will be too late. This same senior officer noted, "what I see today are staff officers who, for the most part, don't have the background and expertise to interpret problems, design fixes and, importantly, raise the issues to the appropriate decision level. This will come back to bite us if we're not careful."

The ACC staff is beginning to see the effects of fewer people with nuclear experience, particularly with regard to nuclear hardness programs. A senior officer in HQACC related that key personnel at the systems program office had little understanding of why they needed to be concerned about nuclear hardness of the E-4. Similarly, troops and some first-line supervisors in the field often fail to understand and appreciate the need for nuclear hardness maintenance.

A staff leader interviewed at HQACC also expressed concerns about the current depth of understanding of nuclear issues across the staff. For example, a draft of the Nuclear Posture Review was recently circulated through the headquarters for comment. Nearly all of the offices had "no comment," indicating to the interviewee a lack of understanding about issues that might be important to them now, or could affect them in the future. Looking ahead, ACC, AFSPC, and USSTRATCOM all expressed concern that future leaders may lack the depth of understanding and commitment to the nuclear mission to be effective advocates for nuclear systems, or fail to appreciate the significance of safety, surety, and security issues.

At HQACC and HQ8th Air Force, there were concerns over the lack of experience in the security forces and emergency action areas. They see a significant bow wave in nuclear security expertise as the "old SAC guys" retire, and there are not a lot of people coming behind them. One senior officer

commented: "It is worse than dilution – we may have to go without at the HQs so we can fill a slot in the field." In the nuclear command and control area, the ACC staff often cannot find a qualified person in their command to fill a key billet and must look to AFSPC to hire a missileer.

The decline of nuclear expertise in the bomber area is another item of concern expressed by a significant number of senior leaders. Few bomber crew members have sat a nuclear alert and are usually limited to two generation exercises per year. The shift in emphasis from nuclear to conventional is a large part of the dilution problem, but it is more than that. The need to be proficient in the delivery of a variety of weapons -- including traditional gravity bombs, JDAM and CALCM -- adds to the difficulty of remaining proficient in nuclear operations. The bomber dilution problem is probably summarized best by one senior officer at 8th AF: "There is so much more on the plate, and nuclear is only one of many missions – and it is not the primary one." For staff agencies, this translates to very little "new blood" available for assignment, reliance on "old heads" for experience and significant spin up times for new staff officers.

Some offices at HQ AFSPC have made improvement of the overall quality of their resident staff nuclear expertise a high priority. They believe they are in a much better position today in terms of nuclear expertise than a year ago. To do this, however, took considerable general officer and O-6 level attention at both HQ AFSPC and the AF Personnel Center. They expressed concern that while they were able to find experienced officers today, it was "a struggle" (much harder than in the recent past) and they were not certain they would be able to find them in the future. Moreover, their concerns were sufficient enough that one office has hired their first contractor to provide continuity of nuclear expertise.

A number of USSTRATCOM staff leaders expressed concern over the ability of today's staff nuclear planners to be effective in the post-NPR era. The NPR will likely demand much more "agility" from its planners, i.e., most foresee increased near-real time planning and less replicatable, "set-piece" Single Integrated Operational Plan (SIOP) planning. In addition, the NPR is likely to implement the relatively new concept of "capabilities based planning" adding a new and complex challenge to future war planners. Post-NPR staff officers will need to bring to the table not only significant systems expertise, but a fundamental grasp of national level, theater, and rapid/adaptive planning processes as well.

Our face-to-face discussions with a significant number of staff leaders indicate a clear trend in declining expertise. Most believe the staff expertise today is less than it was a few years ago and it would continue to decline in the future.

A senior OSD staff leader, with almost 26 years in the nuclear business, summarized the spectrum of concerns about breadth and depth of nuclear expertise as follows: “nuclear expertise in most areas is on the way down...the bench is very thin...and the farm team is looking low on talent.”

Nuclear Career Issues

It seems clear that despite efforts to correct the perception, there remains the belief that the DoD and Air Force leadership do not place the importance of the nuclear mission at the primacy that many in the business feel it deserves. As such, young officers believe the nuclear career field does not offer a viable future. A senior officer said this – “ICBM officers are legitimately concerned about ICBMs as a viable career – and I believe it impacts the quality of staff officers available for assignment here.”

Others noted that “mixed messages” have been transmitted about nuclear/ICBM careers, i.e., while leaders tell their people, “nuclear is important and you can be successful with a mostly-nuclear career path,” perceptions of young officers today about career success suggest otherwise. Finally, there is a concern that some of the best officers with pure space backgrounds are opting to separate (and take jobs outside the military) rather than do a tour in the ICBM side of the Space Ops career field.

4.3 Findings and Recommendations (Task 4)

4.3.1 Findings

General

1. Senior DoD staff leaders are generally satisfied with the current quality of staff officers and civilians assigned from all three services. With exceptions in some specialized areas, the officers/civilians have sufficient nuclear experience to satisfactorily accomplish today’s mission.
 - Nearly all of the survey respondents (84%) indicated they had sufficient expertise in their organizations and were satisfied with the technical and operational skills of the nuclear staff personnel in their organizations
2. These same senior leaders, however, view the quality and quantity of staff nuclear expertise as being in a state of decline since the end of the Cold War. Several described the dwindling pool of expertise as “living off the fat of the land,” with an impending “cliff” (onset of significant expertise shortfalls) coming within the next 5-7 years. On most staffs,

service civilians and contractors are providing needed continuity and compensating for some expertise shortfalls.

- Approximately one-half of the responses to the survey indicated staff nuclear expertise is less today than it was a few years ago, and there is no indication it will get any better.
- An even larger percentage of respondents to the survey thought that nuclear expertise would continue to decline.
- Organizations acknowledge they are “getting by” not because the system is producing officers with the desired breadth and depth of experience (the Army is the exception), but there are enough “old heads” around left over from the Cold War days.
- One senior civilian opined that the opportunity to serve at SAC headquarters used to attract the “cream of the crop”; that does not appear to be the case anymore (in terms of USSTRATCOM assignments).

3. Nearly all staff leaders expressed concern about the impacts on nuclear expertise of a perceived lack of senior DoD leadership attention to “things nuclear.” These concerns fuel widespread perceptions, particularly among young Air Force officers, that nuclear careers are “dead-end.” Many leaders expressed fears that today’s top-notch young officers are avoiding nuclear careers, thus producing a cadre of future leaders less capable of advocating nuclear programs, providing crucial nuclear advice, and running large, nuclear surety-intensive operations.

- AFSPC and USSTRATCOM staff leaders indicate their ICBM officers hear “confusing signals” about the nuclear career field.
- Despite efforts to the contrary, some young officers are voting with their feet; promising young officers are opting for other career tracks.
- Some officers are separating rather than take a nuclear assignment.
- High ranking (3, 4-star) officers say ICBM officers are legitimately concerned about a viable career in the nuclear business.
- Some officers in ACC are concerned about the perceived level of commitment of their command’s leadership to the nuclear mission.

4. There are current expertise shortfalls in some specialized nuclear areas: munitions and stockpile management, nuclear weapons effects modeling and simulation, safety and surety, and post-attack residual capability assessment (RECA). Staff leaders are concerned about the lack of specialized expertise in the “pipeline” to replace retiring experts or a program to develop them. Continuity of expertise may become a near-term problem in these areas.
 - Some specialized nuclear staff fields are often manned by old “SAC types” with few young officers in the pipeline.
 - Senior staff leaders cite several examples of lack of qualified officers to fill existing vacancies and the inability to find service civilians or contractors.
 - Senior staff leaders report that specialized nuclear expertise in parallel DoD agencies has declined significantly - and that they must spend considerable time “educating” them on key issues.
5. There is a strong belief that staff nuclear expertise has become “diluted” (i.e., officers possess less depth of expertise/have fewer total years in nuclear assignments) compared to a few years ago. This is particularly apparent in the Air Force where career opportunities for junior officers in nuclear assignments have changed significantly. Career paths and choices today for these officers are more diverse than during the Cold War. This makes the development of nuclear expertise difficult indeed.
 - The merging of space and ICBM career fields has resulted in less-specialized officers.
 - Bomber unit missions/emphasis have shifted from nuclear to conventional. Bomber crews must be proficient in the delivery of a variety of complex weapons. Nuclear expertise in bomber operational/planning arenas was described as “fragile” by several staff leaders.
 - Senior leaders are finding less time available to coach and mentor these young officers.

- One senior officer lamented that the staff expertise problem is moving on in time, getting worse each year and nothing concrete is planned to stop the movement prior to the impending cliff -- after which it will be too late.
- The same senior officer noted, "what I see today are staff officers who, for the most part, don't have the background and expertise to interpret problems, design fixes and, importantly, raise the issues to the appropriate decision level. This will come back to bite us if we're not careful."
- The trend is to produce generalists rather than specialists; depth of understanding is declining (particularly noticeable in staff work); one senior officer said, "you don't realize the impact until you are surprised."

6. Post-NPR nuclear planning will present a new set of challenges which will require future war planners to have not only significant systems expertise, but a fundamental grasp of national level, theater, and rapid/adaptive planning processes as well. There is concern, expressed by a number of staff leaders, that these challenges will severely test the talents and expertise of our nuclear staff officer corps.

Army

- 7. The Army, with US Army Nuclear and Chemical Agency (USANCA) in charge, has a relatively small (270), but well-developed and managed cadre of staff officers that provide senior leadership advice on employment, consequences and effects of nuclear weapons and the survival of equipment and personnel on the battlefield.
 - USANCA acts as career field proponent for nuclear officers, close coordination with DCS/Personnel to makes the assignment system work.
- 8. USANCA has a clear picture of the nuclear staff billets they must fill, the background and expertise required to be successful in those billets, and a well-defined career path for their nuclear staff officers (Functional Area 52's). Since the Army has not been in the "delivery" business for some time, officers typically enter the career field at the 10-12 year point.
 - Most billets are at DTRA.

- The Army identifies the requirements of the job, recruits an officer with the proper background (usually technical) and then provides additional advance education before the officer assumes the position.
- 9. The Army's relatively small community allows for a very personal approach to the assignment process. Organizations are quite pleased with the quality of Army nuclear staff officers and all indicators point to continued maintenance of nuclear expertise.
 - Close coordination between USANCA, nuclear officers, gaining agencies, and Army personnel (assignments).
 - Officers are motivated; opportunity for technical career (and possible post-Army employment) and an advanced degree are incentives.
 - Officers clearly understand their career path and how they will rotate through agencies like DTRA, 4-star commands, etc.

Navy

- 10. The Navy nuclear community has become smaller, but remains focused and mission-centered. The Strategic Systems Program Office (SSPO) continues to provide key technical and strategic systems management expertise to the nuclear Navy. They have formed a cohesive uniformed-civilian-industry team to oversee technical weapons and SSBN systems in a "cradle to grave" manner. The civilian force is "graying" and, the Navy is stepping up to the challenge of attracting smart, young civilians into the nuclear business.
 - Challenge is attracting young, technical talent when the mission is to sustain the force, not design, build and deploy new systems.
 - Continuity and specialized expertise through the use of LDOs.
- 11. Most Navy staff nuclear expertise comes from the "1120" career field officers who support users between at-sea assignments. Leaders are satisfied with the quality of SSBN-SSN staff officers assigned, but clearly less satisfied with the quality of non-nuclear staff officers.
 - Navy continues to assign qualified, motivated nuclear power qualified officers to major staffs. Personal interest by the most recent CINCSTRAT is a contributing factor to this high quality.

- Some perception that non-nuclear officers are assigned to nuclear billets because they are not competitive in their primary areas (aviation, surface warfare, etc).

12. Most users would like the current short staff tour for nuclear power qualified officers (22 months) to be longer.

- Continuity is a recognized problem. Billets are often gapped awaiting personnel to complete sea duty.
- Most officers have had no staff experience so there is on-the-job training to become effective.

Air Force

13. Like the Navy, the Air Force nuclear cadre has become smaller but remains highly professional and mission-oriented. Despite a small staff, the HQ USAF Directorate of Nuclear and Counterproliferation (AF/XON) has become a particularly effective nuclear focal point and advocate for Air Force nuclear issues and people.

14. The Air Force has a well-established process to match people to billets. Even though the ICBM community is still sizable, assignment specialists pay personal attention to match individual qualifications to specific job requirements.

- Nuclear experience identifiers have helped.
- Hands-on process to fit personnel qualifications to position description, job requirements; no centralized database of nuclear staff positions and associated requirements and qualifications.

15. Users are generally satisfied with the quality of Air Force staff officers assigned to their organizations, although most agree the depth of expertise has declined over the past few years. At each agency visited, the majority of users expressed concerns over the future availability of nuclear expertise in the next 5-7 years. We observed a general theme that officers with specialized nuclear expertise are getting harder to find.

- Bomber emphasis has shifted to conventional almost to the exclusion of nuclear. Few bomber staff officers have had nuclear alert experience.

- Nuclear command and control experience at ACC is in short supply. Missileers from AFSPC are filling slots formerly held by bomber crew members.
- 16. Most staff leaders observed that many Air Force officers continue to perceive the nuclear career field as a “dead end” or not viable. They also expressed concerns that perceived lack of support for “things nuclear” at the senior DoD leadership levels results in “the best officers pursuing other careers.” There have been mixed messages to the troops on what is a good career, and career path.
 - Many quality officers in the 13xx career field are lured by the increasing importance of space operations and perceived cutting edge technology; some mid-level officers are opting to separate rather than leave a space assignment for ICBM duty.

4.3.2 Recommendations

1. The DoD should immediately address expertise shortfalls in the specialized staff fields of munitions/stockpile maintenance, nuclear effects modeling and simulation, safety and surety, and post-attack RECA.
 - It will take time to grow/train next generation specialists in these areas.
 - DoD should consider expanding the Air Force Nuclear Technology Fellowship Program to provide in-depth knowledge in key disciplines.
 - DoD should consider use of the Air Force Institute of Technology (AFIT) and/or the Naval Post-Graduate School for training resources.
2. The Air Force should consider the following recommendations to address two primary areas of concern identified in this assessment: “dilution” of nuclear expertise in the ICBM and bomber arenas, and the negative perceptions associated with the viability of a career in the nuclear field.
 - Re-institute a selective, career path enhancement program for ICBM officers (analogous to the TOP HAND program under SAC). This relatively small program of 10-15 officers per year would re-invigorate career visibility and serve to attract a top-notch core of future leaders to “major” in the ICBM/nuclear career field.

- As a companion to the above program, develop an Advanced Nuclear Course for both ICBM and bomber officers that parallels the existing Weapons Instructor Course (WIC). This new course would expose promising ICBM and bomber officers to the full spectrum of the nuclear business. A small number of officers annually would be exposed to national level strategy and policy issues, learn strategic and theater nuclear planning, observe Air Force and Navy nuclear operations and become acquainted with technical weapons operations/issues at our national nuclear laboratories. This course would provide these officers a taste of the importance of a nuclear career, train them in key areas of planning and operations and inspire them toward a long-term career in the nuclear business.
- Senior leaders should reaffirm and clarify the need for and value of core expertise in nuclear career fields. Missileers need to hear and be convinced that it is “OK to major in” the nuclear mission and that this track is viable for promotion and command.
- Consider starting all space and missile officers with an ICBM crew duty assignment and re-instate a career pyramid/path that enables and supports a successful career (to O-6 and command) for nuclear skilled officers. Such a pyramid/path would include the previous recommendations.
- Consider a concept similar to the Navy’s Limited Duty Officer (LDO) program. Promising NCOs with ICBM/bomber experience could compete for OTS and be assigned follow-on duty in Air Force nuclear business for the remainder of their careers. A program of this type could produce a solid “core” of expertise and continuity in nuclear operations, maintenance, security, safety and surety.

3. The Air Force should continue to develop and expand the process to identify, track and develop needed staff nuclear expertise. As such, we believe the Developing Aerospace Leaders (DAL) concept of a “certification matrix” that combines education, training and experience to attain levels of expertise has merit. The career path enhancement (TOP HAND) and Advanced Nuclear Course initiatives mentioned above track with this concept.

- Establish a personnel nuclear identifier that is tied to education, training, and job experience in addition to simply PRP certification. Develop a methodology to systematically update personal records that reflect nuclear experience.

- Resurrect the Missile and Space Career Opportunities Track (MASCOT) to provide a centralized listing and description of staff opportunities

4. DoD and the Services should address the need for continuity of staff nuclear expertise through expanded use of civilian billets, contractor personnel, and/or Guard and Reserve if available. In particular, the Services should focus on those areas most in need of staff continuity (e.g., safety/surety, munitions/stockpile management, nuclear effects modeling and simulation and RECA).

- DoD should prepare a game plan for utilization of civilian and contractor assets to provide current and long-term continuity
- DoD should examine the merits of using Knowledge Management and Preservation techniques to capture, share and preserve key “tacit” knowledge assets across the DoD.

5. The Army should review the need for recruiting and developing civilian staff nuclear expertise (little exists now).

6. The Navy should review its policy for assigning non-SSBN-SSN officers to staff nuclear billets to ensure user needs are fully met.

7. The Navy should determine the feasibility of extending nuclear power qualified officer staff tours beyond 22 months.

8. The DoD should review the staff nuclear expertise implications for planning in the post-NPR era.

- The expertise demands on tomorrow's nuclear planners will likely be significantly higher upon implementation of the NPR (e.g., increased demands for near-real time planning vs. set-piece war plans, the need for in depth systems knowledge to complement the near-real time aspects of planning, better understanding of effects/modeling, etc.).
- Short (22 month) tours for Navy nuclear planners, coupled with expected future shortfalls/dilution in ICBM and bomber nuclear expertise, will not make this problem simple to resolve.

- With the NPR placing a premium on the relatively new concept of “capabilities-based planning”, the DoD should consider developing and providing a course of instruction that addresses this new requirement. Such a course at the Defense Nuclear Weapons School (DNWS) or USSTRATCOM could help to institutionalize this process for the department.

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Appendices

- A. Organizations Visited or Contacted
- B. Staff Nuclear Expertise Questionnaire for Staff Leaders
- C. Staff Nuclear Expertise Questionnaire Results

Appendix A: Organizations Visited or Contacted

- HQ USAF/XON
- CSAF Developing Aerospace Leaders Program Office
- Air Force Personnel Center
- HQ AFSPC
- HQ 20TH Air Force
- HQ ACC
- HQ 8th Air Force
- USANCA
- Navy SSPO
- Navy N-51
- SUBLANT
- Navy Personnel Command
- USSTRATCOM
- DTRA
- JCS/J-5 Nuclear and Counterproliferation Division
- JCS/J-38
- OSD Staff

Appendix B: Staff Nuclear Expertise Questionnaire for Staff Leaders

Organization_____ # Of People In Your Organization_____
Rank_____ # Years Experience You Have In The “Nuclear Business”_____

Assume that “staff nuclear expertise” is defined as “The combination of knowledge, skills, perspective, maturity and experience gained through operational and staff assignments within a nuclear discipline, and applied to staff duties above the unit level.

Please tell us how strongly you agree or disagree with the following statements?
(Strongly Disagree -SD; Disagree -D; Agree -A; Strongly Agree SA; Don’t Know - DK)

1. There is sufficient staff nuclear expertise in my organization to do our job.
SD D A SA DK
2. I am satisfied with the technical/operational skills of the staff nuclear personnel in my organization.
3. I am satisfied with the depth and breadth of experience of staff nuclear personnel in my organization.
4. The overall level of staff nuclear expertise in my organization is about the same today as it was a few years ago.
5. I would expect the staff nuclear expertise in my organization will continue at about the same level for the next few years as it is today.
6. The Army/Navy/Air Force program to develop personnel with staff nuclear expertise is meeting our needs.
Army SD D A SA DK
Navy SD D A SA DK
USAF SD D A SA DK
7. There are a sufficient number of personnel with staff nuclear experience in my organization.
8. Overall, I am satisfied with the quality of staff nuclear personnel in my organization.
9. Overall, I am satisfied with the quantity of nuclear staff personnel in my organization.
10. I am confident that our organization will have enough people with the right staff nuclear expertise to do our job in the future.

Appendix C: Staff Nuclear Expertise Questionnaire Results

During this study, 94 interviews were conducted and 45 questionnaires were completed and collected. Surveys were completed from Navy/OPNAV, AFSPC, ACC, Joint Staff, and USSTRATCOM. The surveys maintained the same ten questions and five value selections throughout the study. The ten questions and results follow:

Question	Disagree	Agree
1. There is sufficient staff nuclear expertise in my organization to do our job.	16%	84%
2. I am satisfied with the <u>technical/operational skills</u> of the staff nuclear personnel in my organization.	16%	84%
3. I am satisfied with the <u>depth and breadth of experience</u> of staff nuclear personnel in my organization.	31%	69%
4. The overall level of staff nuclear expertise in my organization is about the same today as it was a few years ago.	47%	53%
5. I would expect the staff nuclear expertise in my organization will continue at about the same level for the next few years as it is today.	47%	53%
6. The Army/Navy/Air Force program to develop personnel with staff nuclear expertise is meeting our needs.	40%	60%
7. There are a sufficient number of personnel with staff nuclear experience in my organization.	40%	60%
8. Overall, I am satisfied with the <u>quality</u> of staff nuclear personnel in my organization.	11%	89%
9. Overall, I am satisfied with the <u>quantity</u> of nuclear staff personnel in my organization.	47%	53%
10. I am confident that our organization will have enough people with the right staff nuclear expertise to do our job in the future.	53%	47%

The five value selections ranged from strongly disagree, disagree, agree, to strongly agree, and don't know. For ease of statistical compilation, the value selections were combined into "Disagree" and "Agree" categories. Staff nuclear expertise is defined as the combination of knowledge, skills, perspective, maturity and experience gained through operational and staff assignments within a nuclear discipline, and applied to staff duties above the unit level.